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ABSTRACT

To aid preschool and primary teachers, the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) is reviewed from the perspective of the early childhood educator. First, a brief annotated bibliography of literature focusing on clinical and educational uses of the WPPSI is provided. The bibliography is followed by a review of basic statistical concepts and assessment techniques. A table illustrates interpretive rationales and implications of high and low scores for 11 WPPSI subtests, briefly describing instructional implications. (RH)

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INSTRUCTIONAL IMPLICATIONS OF WPPSI
SUBTESTS FOR THE EARLY CHILDHOOD EDUCATOR

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Instructional Implications of WPPSI Subtests for the Early Childhood Educator

Introduction

The early childhood educator must be aware of many different symptoms and behaviors in working with young children so as to determine when a child needs special help. These symptoms range from signs of physical disabilities to indications of pronounced emotional upset and deviations in intellectual development.

The teacher who has learned to recognize these signs has achieved an important step in working with children who have special needs. Another important step is the integration of children with special problems into the early childhood center. This requires careful assessment before admission and flexibility of adjustment following entrance to school. Toward this end, the teacher is required to work with professionals from various disciplines --- consulting, reporting, and interpreting findings.

It is important, therefore, that the early childhood educator develop expertise in educational assessment. One important phase in educational assessment is in interpretation of psychological reports. With these ideas as my springboard, I have reviewed the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) from the early childhood educator's perspective. This review is narrowed to interpretative rationales and instructional implications of WPPSI subtests, with an annotated review of the literature. Consideration has also been included of how the educator can be assisted in reading and understanding statistical references/analysis of data.

Annotated Review of the Literature

The WPPSI has been subjected to numerous studies: factor analytic; comparisons to the WISC-R; content validity; and reliability. The literature is far from voluminous in clinical and educational uses of the WPPSI. The following listings address this area.

Reynolds, C.R., Wright, D., Dappen, L., "A Comparison of the Criterion-Related Validity (Academic Achievement) of the WPPSI and the WISC-R." Psychology in The Schools, 1981 volume XVIII. Number 1, pages 20-23.

The results from this study support the use of two instruments as equivalent predictors of schievevement. Correlations of WPPSI IQs with concurrently administered subtests from the WRAT were compared with analogous WISC-R/WRAT correlations in a group of children referred by regular classroom teachers for school psychological services. The comparisons indicated no significant differences in the magnitudes of the associations of the WPPSI and the WISC-R with the WRAT.

Examination of these data should provide useful information regarding the interpretation of the two instruments and especially the WISC-R when the WPPSI has been administered previously.

Gallinore, R., Thorp, R.G., "The Prediction and Explanation of Academic Achievement," Technical Report 54. California University, 1976.

Test score data for kindergarten and first grade children were subjected to several forms of multivariate analysis. A general ability factor defined by WPPSI Verbal IQ, Performance IQ, Standard English Repetition Test; Metropolitan Readiness Tests; and, Hawaiian Creole English Repetition Test was found. When children enter at kindergarten there is a single dimension measured on these tests, that differentiates among individuals. Efforts to determine the best kindergarten predictors of first grade achievement indicated that general ability factors had the greatest predictive utility.

White,D.,Jacobs,E., "The Prediction of First-Grade Reading Achievement From WPPSI Scores of Preschool Children," Psychology in the Schools, Volume 16,Number 2,April,1979.

Twenty eight suburban middle class children were given the WPPSI at ages three to five and retested with the Gray Oral Reading Test near the end of first grade. Significant correlations between WPPSI IQs and reading were found. Significant correlations with reading were obtained using four subtests: Vocabulary, Arithmetic, Similarities, and Geometric Design.

Sewell,T.E., "A Comparison of The WPPSI and Stanford-Binet Intelligence Scale (1972) Among Lower SES Black Children," Temple University, Philadelphia.

Compared the performance of 35 lower SES black kindergarten children on the WPPSI and the 1922 Norm Edition of the Stanford-Binet. The WPPSI was found to yield a significantly higher mean IQ than the Binet. Results were interpreted as suggesting that the WPPSI might be a more appropriate measure of cognitive ability for black children of lower socioeconomic status.

Cooley,N., "The Wechsler Preschool and Primary Scale of Intelligence: Difficulty Order of Subtest Questions," Nova University, Florida. Psychology in the Schools January,1977,Volume 14,Number 1.

The purpose of the study was to test whether the order of the subtest questions was appropriate(moving from least to most difficult). Findings suggested changes in the order of questions of the Vocabulary, Picture Completion, Similarities, and Comprehension Subtests..

Fairweather, H., Butterworth, G., "The WPPSI At Four Years: A Sex Difference in Verbal-Performance Discrepancies," British Journal of Education Psychology, Volume 47, pages 85-90, 1977.

Results underline the necessity for comprehensive control data on materials used in studies of cognitive development. 72 boys and 72 girls aged 4½ years were tested on the WPPSI. Twenty percent of the children had discrepancies between the Verbal and Performance sub-scales of 15 points or more. Boys' subgroups were distinguished by changes in performance scores alone whereas for girls both performance and verbal quotients deviated equally.

Hagin, Rosa A.: and Others, "Clinical-Diagnostic Use of the WPPSI in Predicting Learning Disabilities in Grade One," New York University, November, 1970.

The WPPSI was used to assist in the understanding of children who had difficulty learning to read well. First graders in Manhattan, New York were administered the WPPSI. Tentative conclusions indicate that the WPPSI produced clinical material consistent with the diagnostic subgroups; the quantitative and qualitative WPPSI material helps in the selection and diagnostic processes in planning intervention; and it is inadvisable to assume that learning disability is a homogeneous condition manifesting itself in a characteristic cognitive pattern in first grade.

Mukherjee, B.N., "The Factorial Structure of Wechsler's Preschool and Primary Scale of Intelligence At Successive Age Levels," Council for Social Development, New Delhi, 1974.

A factor analysis of the correlation matrix for the subtests of WPPSI was carried out for each of the age groups between 4 and 6½ years. Findings support the notion of the structural invariance of the WPPSI intercorrelation matrices at different age levels. In each age group the various intercorrelation matrices yield a general factor with high saturation, thus interpreted as a general intelligence factor. The factor-analytic investigation does not show any substantial change as a function of age in the nature of general intelligence.

Statistical Techniques and the Analysis of Data: Points for the Early
Childhood Educator

When formal and informal assessment procedures are used, there are many rules to follow. Details that follow cover the principles of selecting and employing appropriate techniques and, where necessary, designing or modifying them.

One major consideration in regard to standardized testing is the crucial phase of scoring and interpreting the results. Standardized tests offer a variety of kinds of scores, the conversion process from raw scores to other kinds of scores is important.

Raw score - the total number of points an individual earns on a test before it is converted to any formal or standardized scoring system. A raw score, by itself, is uninterpretable since there is no way of knowing how it compares to anything else.

Norm(groups) - once a raw score is converted to some scale of measurement, usually in terms of a rank or deviation from the mean, the researcher should ask, to whom is he/she being compared? Standardized tests report scores based on a norm group representing a defined population and until this comparison group is clearly known, a satisfactory interpretation of the score is not possible.

Conversion - raw scores to other scores are meaningless unless they are considered to the scores achieved by other members of the population. Some statistical conversion methods are:

age or grade scores - the interpreter translates raw scores into the average chronological/grade at which students in the norm population achieve that raw score.

Percentiles - many tests scores can be converted into percentile ranks. The percentile rank indicates the percentage of students in the norm group that received the same score or lower raw score.

Raw scores begin to have meaning when they are rank ordered from high to low. There are two statistics used: (a) the percentile rank a number between 0 and 100 indicating the percent of cases in a norm group falling at or below that score; and (b) the percentile, which is a point on a scale of scores at or below which a given percent of the cases fall.

Standard scores - the most powerful scores, derived from the properties of the normal probability curve and preserving the absolute differences between scores. They can be used in calculating averages and correlations yielding the same results as the original raw scores. They have the advantage of being directly comparable if the reference groups are equivalent.

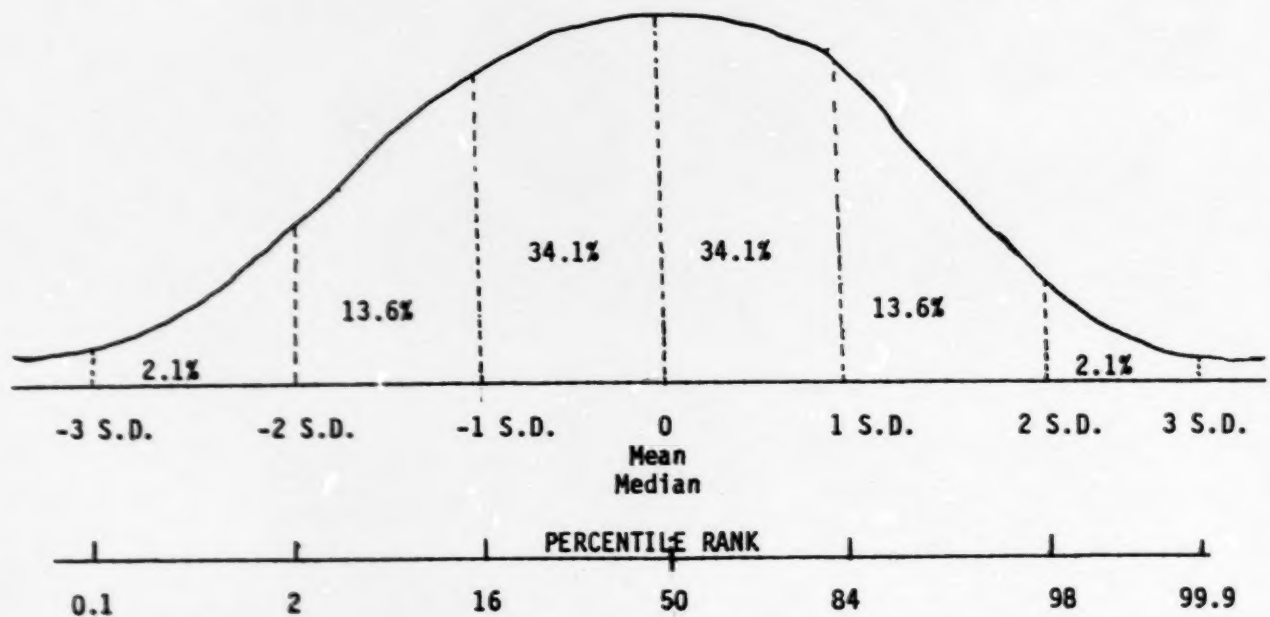
Once a test is scored, it is necessary to understand the meaning of the scores and use them in making decisions. A system of interpreting scores in ranges that may be used for most formal assessment procedures, and other statistical factors in interpretation follows.

Central Tendency - provides a single most typical score as representative of a group of scores; the "trend" of a group of measures as indicated by some type of average, usually the mean or the median

Variability - the spread or dispersion of test scores, indicated by the standard deviation.

Standard deviation - expresses the variability of the distribution of scores. The more the scores cluster around the mean, the smaller the standard deviation.

For a normal distribution, approximately two thirds (68 percent) of the scores are within the range from one standard deviation below the mean to one standard deviation above the mean. Computation of the standard deviation is based upon the square of the deviation of each score from the mean.



Standard error - a statistic providing an estimate of the possible magnitude of "error" present in some obtained measure, whether an individual score or some group measure, as a mean or a relationship(correlation/coefficient).

Standard error of measurement - applied to a single obtained score, or to group averages, standard deviations, correlation coefficients, etc., the amount by which the score(s) may differ from the hypothetical true score due to errors of measurement. The larger the standard error of measurement, the less reliable the score.

Finally, educators need to have criteria for selecting and evaluating informal procedures. In order to insure quality assessments, behavioral observations, work sample analysis, task analysis, criterion-referenced tests, and other techniques must be carefully designed and used.

Task analysis - a technique that is used both for assessment and instructional planning. It is the process of isolating, sequencing, and describing all the essential components of a task. It involves breaking down the task into essential subtasks, arranging the subtasks in sequence and, describing each subtask by means of an objective.

Criterion-Referenced Tests - compare a student's performance to some criterion, rather than to the performance to of other students. The criterion against which a student's performance is judged relates to the school curriculum.

Work sample analysis - use of a sample of student's work for careful study. The work sample may be anything produced by the student - test papers, a written assignment, etc.

Informal inventories - examine a student's performance in relation to the school curriculum. They are designed to survey a student's achievement in a relatively broad area of the curriculum (reading, arithmetic, etc.) The results of informal techniques are difficult to interpret. It is difficult to translate the results directly into instructional strategies because there are no guidelines for determining when student performance in any given area warrants intervention.

Intrepretative Rationales and Implications of High and Low Scores for WPPSI Subtests
with Instructional Implications

<u>Ability</u>	<u>Possible Implications of High Scores</u>	<u>Possible Implications of Low Scores</u>	<u>Instructional Implications</u>
INFORMATION			
Verbal comprehension Range of knowledge Long range memory	Good range of information Good memory Enriched background Alertness and interest in environment	Poor range of information Poor memory Tendency to give up easily Foreign background	Provide opportunities for succe Reduce frustration for child when possible Identify and describe the child's feelings
VOCABULARY			
Verbal comprehension Language development Fund of information Expressive ability Word knowledge	Good verbal comprehension Good family or cultural background Good pre-schooling Intellectual striving	Poor verbal comprehension Limited educational or family background Difficulty in verbalization Verbalization not encouraged in culture	Encourage conversation and dialogue Use questions to generate and develop language Give the child something real to talk about
ARITHMETIC			
Numerical reasoning Mental computation Quantitative concepts	Good concentration Facility in mental arithmetic Ability to focus attention	Poor concentration Distractibility Blocking toward mathematical tasks	One-to-one correspondence activities Seriation activities Symbol and numeral represen- tations
SIMILARITIES			
Logical thinking Short-term memory Rote memory Attention	Good rote memory Good immediate recall ability Ability to attend well in a testing situation	Anxiety Inattention Distractibility Difficulty in auditory sequencing	Role playing activities Divergent questioning "What will happen if activities

<u>Ability</u>	<u>Possible Implications of High Scores</u>	<u>Possible Implications of Low Scores</u>	<u>Instructional Implications</u>
COMPREHENSION			
Verbal comprehension Social judgment Logical reasoning Common sense	Good social judgment Knowledge of rules of conventional behavior Ability to organize Social maturity	Poor social judgment Failure to take personal responsibility Difficulty in expressing ideas verbally	Sharing Activities Development of empathy Rights/respect for others Value of cooperation
SENTENCES			
Concentration Immediate auditory memory	Ability to attend well in a testing situation Good rote memory	Anxiety Inattention Distractibility	Listening to stories, sharing pictures Dictating stories after a field trip
ANIMAL HOUSE			
Perceptual organization Attention Finger and manual dexterity Concentration	Visual-motor dexterity Good concentration Sustained energy or persistence Good motivation or desire for achievement	Visual-motor coordination difficulties Distractibility Visual defects Lethargy	Discriminating rough, smooth, heavy, light Buckling, zipping, lacing Letter discrimination
PICTURE COMPLETION			
Perceptual organization Ability to differentiate essential from non- essential details Reasoning	Good perception and concen- tration Good alertness to details Ability to establish a learning set quickly	Anxiety affecting concentration and attention Preoccupation with irrelevant details Negativism	Differentiate among visual patterns Recall from memory stimuli Relational Concepts

Ability

Possible
Implications of
High Scores

Possible
Implications of
Low Scores

Instructional
Implications

MAZES

Perceptual
organization
Planning ability
Foresight
Visual-motor
control

Good perceptual
organization
Planning efficiency
Speed and accuracy
Ability to follow directions

Poor visual-motor organization
Poor planning efficiency
Difficulty in delaying action

Use apparatus to
to promote physical
skill
Motor activities
Sensory experiences
Fine muscle activities

BLOCK DESIGN

Perceptual organization
Visual-motor
coordination
Spatial visualization
Abstract conceptualizing
ability
Analysis and synthesis

Good visual-motor
spatial integration
Good conceptualizing ability
Analyzing and synthesizing
Speed and accuracy in sizing
up a problem
Good hand-eye coordination

Poor visual-motor-spatial
integration
Visual-perceptual problems

Visual patterns
Painting
Block Play
Matching
Fine motor activities

GEOMETRIC DESIGN

Perceptual
organization
Perceptual-
motor ability
Visual-motor
organization

Good perceptual-motor ability
Good eye-hand coordination

Poor perceptual-motor ability
Poor eye-hand coordination
Developmental immaturity

Physical skill
development
Block Play
Copying patterns
Self-correctional
shape/form tasks

(Table adapted from Sattler, 1982)

Summary

One of the most difficult tasks facing the teachers of young children is that of determining which among the varying patterns of individual differences among children constitute "problems." Once determined the follow-up and on-going assessment is crucial.

The WPPSI has many assets, as well as some limitations. Excellent psychometric properties are present; diagnostic information for assessment of cognitive abilities; and the high interest displayed by children who have taken the test are assets to be noted.

The administration time is too long; there is no clear differentiation of abilities at the lower end of the scale; scoring of responses on subtests is difficult; the Comprehension subtest may be somewhat ambiguous for lower-class children; and the failure to provide information about cut-off criteria--were determined empirically or intuitively--are among the limitations of the WPPSI.

There is little published research about the clinically meaningful use of scatter on the WPPSI, and research in this area is needed. Surveys have found that psychological reports in a variety of settings sometimes fail to communicate clearly. The early childhood educator with the appropriate expertise may be able to overcome the problems of organization, terminology, content, style, and recommendations of psychological reports. An important contribution of the report -- helping the teacher approach the child in a new way, may be fostered.

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